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PATENT APPLICATION  
Mo-4532  
LeA 31,223

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF )  
FRANK RICHTER ET AL ) GROUP NO.: 1711  
SERIAL NUMBER: 08/713,905 ) EXAMINER: R. A. SERGENT  
FILED: SEPTEMBER 13, 1996 )  
TITLE: PROCESS FOR THE PRODUCTION )  
OF ETHER ISOCYANATES )

LETTER

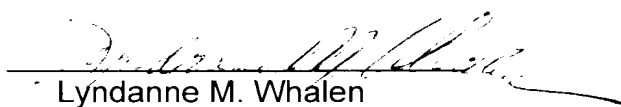
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Enclosed herewith are three copies of an Appeal Brief in the matter of the subject Appeal. Please charge the fee for filing the Brief, \$320.00, to our Deposit Account Number 13-3848.

Respectfully submitted

By

  
Lyndanne M. Whalen  
Attorney for Appellants  
Reg. No. 29,457

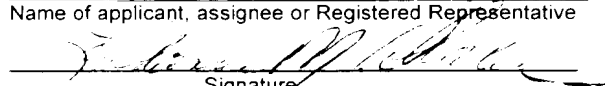
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Lyndanne M. Whalen, Reg. No. 29,457

Name of applicant, assignee or Registered Representative

  
Signature

May 27, 2003  
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PATENT APPLICATION  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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OF ETHER ISOCYANATES )

APPEAL BRIEF

Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Brief, submitted in triplicate, is an Appeal from the Final Action of the Examiner dated December 19, 2002 in which the rejections of Claims 1-4 (all of the pending claims) were maintained.

I. REAL PARTY IN INTEREST

Each of the named inventors has assigned his interest in this application to Bayer Aktiengesellschaft, a German corporation. The real party in interest in this Appeal is therefore Bayer Aktiengesellschaft.

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Date

Lyndanne M. Whalen, Reg. No. 29,457

Name of applicant, assignee or Registered Representative

Signature

May 27, 2003

Date

## II. RELATED APPEALS AND INTERFERENCES

There are no pending appeals or interferences of which Appellants are aware that would be affected by or have a bearing on the Board's decision in this Appeal.

## III. STATUS OF CLAIMS

Claims 1-4 remain pending and are the subject of this Appeal.

Claims 5 and 6 were cancelled in Appellants' Amendment mailed to the U.S.P.T.O. on September 24, 2002.

## IV. STATUS OF AMENDMENTS

Subsequent to the Final Action of the Examiner, Appellants proposed an amendment to Claim 2 in which it was specifically stated that R<sup>1</sup> represents a direct bond of X to the ether oxygen bonded to R<sup>2</sup>. This amendment was entered and the rejection of Claim 2 on the basis of 35 U.S.C. § 112, second paragraph as being indefinite was withdrawn.

No additional amendment(s) to the claims have been made or requested subsequent to the Final Action of the Examiner.

## V. SUMMARY OF THE INVENTION

The present invention relates to a process for the production of ether (poly)isocyanates having a hydrolyzable chlorine content less than or equal to 48 ppm. In the claimed process, an ether (poly)amine is reacted with at least a stoichiometric amount of phosgene in the gas phase at a temperature of from about 50 to about 800°C.

The present invention also relates to three specific isocyanates and mixtures thereof made by this process. The present invention further relates to a process for the production of urethanes from these specific isocyanates.

## VI. ISSUES

- A. Claims 1-4 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specific bases for this rejection are the hydrolyzable chlorine content limitations of "less than or equal to 48 ppm" (Claim 1) and "no more than 43 ppm"(Claim 3).
- B. Claims 1-2 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lehmann et al (U.S. Patent 3,267,122) in view of Joulak et al (U.S. Patent 5,391,683) or Biskup et al (U.S. Patent 5,449,818) or Bischof et al (U.S. Patent 5,516,935).

## VII. GROUPING OF CLAIMS

- A. None of Claims 1-4 will be argued separately in response to ISSUE A. Claims 1-4 therefore stand or fall together with respect to ISSUE A.
- B. Neither Claim 1 nor Claim 2 will be argued separately in response to ISSUE B. Claims 1-2 therefore stand or fall together with respect to ISSUE B.

## VIII. ARGUMENTS

- A. One skilled in the art reading Appellants' specification would recognize that Appellants' were in possession of the claimed invention at the time the present application was filed.

Appellants' claims require that the isocyanate have a hydrolyzable chlorine content "less than or equal to 48 ppm" (Claim 1) and a hydrolyzable chlorine content of "no more than 43 ppm" (Claim 3).

The Examiner has argued that:

"The examples provide support only for 24 ppm, 34 ppm, 43 ppm, 44 ppm, and 48 ppm. The position is taken that the examples do not provide support for values below 24 ppm or above 48 ppm or for ranges of values between the specified values." (at page 2, lines 10-13 of the Office Action dated December 19, 2002)

Appellants' **do not** claim hydrolyzable chlorine contents above 48 ppm.

Appellants maintain that the Examiner's position is contrary to the CCPA's holding in In re Eickmeyer, 202 USPQ 655 (CCPA 1979) in which it was held that:

... the limitation "at an elevated temperature of at least about 56°C." is fully described in appellant's specification and in the parent applications. (at page 663)

where the applicant's Examples were done at temperatures of 56 and 80°C.

In response, the Examiner has argued that In re Eickmeyer, *supra*, is distinguishable from the present case because in In re Eickmeyer, "support for the claimed temperature range also stemmed from the knowledge that elevated temperatures were known from analogous prior art systems" and "Similar support has not been provided in the instant case." (NOTE under paragraph 2(d) of PTO-303)

Appellants respectfully submit that In re Eickmeyer is not distinguishable from the present case because there is support for Appellants' position that their specification does convey to one of ordinary skill in the art that the process of the present invention is capable of producing an ether isocyanate having a hydrolyzable chlorine content of less than 48 ppm.

More specifically, in addition to the hydrolyzable chlorine contents reported in the Examples, Appellants' specification teaches at page 5, lines 19-21 that the:

"The ether isocyanate may then be isolated in **pure form** by known processes such as distillation, crystallization, extraction or film distillation, or recovered as raw product (solution)." (emphasis added)

In Hawley's Condensed Chemical Dictionary, 11th Edition, the definition for "chemical purity" (at page 980, copy enclosed) includes the statement "In other words, purity exists when **no impurity** can be detected by any experimental procedure." (emphasis added)

Hydrolyzable chlorine is an impurity which can obviously be detected by an experimental procedure.

Appellants' specification does therefore include teachings which support their claimed hydrolyzable chlorine contents.

- B. Appellants' invention as claimed in Claims 1 and 2 are not rendered obvious by the combined teachings of Lehmann et al, Joulak et al, Biskup et al or Bischof et al (U.S. Patent 5,516,935).

Lehmann et al does not teach a gas phase phosgenation process for the production of ether isocyanates.

Neither Joulak et al nor Bischof et al teaches or suggests that the disclosed gas phase phosgenation processes could be used to produce ether isocyanates.

Biskup et al teaches that aromatic amines in which an ether group is present could be used in the disclosed gas phase process for the production of aromatic diisocyanates **but does not teach or suggest** that the isocyanate produced by that process would retain such ether group. Nor would one skilled in the art expect it to be retained under the conditions present in a gas phase phosgenation process. (See Declaration of Dr. Stutz submitted with previous response and the prior art teachings discussed therein.)

The Examiner has maintained that the Declaration of Dr. Stutz is insufficient to remove this rejection because: (1) that the Declaration "fails to set forth sufficient rationale as to why the disclosure within Biskup et al. that ether groups may be present within the amine should be dismissed."; and (2) the comments regarding contact time are not commensurate in scope with Appellants' claims.

Appellants maintain that the Examiner's criticisms do not provide a proper basis for disregarding Dr. Stutz' Declaration in which he discusses the bases for his

conclusion that one skilled in the art would not have considered the claimed obvious at the time Appellants' made their invention.

More specifically, Appellants have **not** argued that the teaching of Biskup et al with respect to the presence of ether groups in the amine **starting materials** should be dismissed. However, **it can not be properly assumed** that the ether groups present in the starting material will be present in the product of a gas phase phosgenation.

That one skilled in the art would **not** have made the assumption upon which the Examiner's rejection is based is supported by Dr. Stutz' citation of sections taken from Annalen der Chemie which teach that even though an ether group is present in the amine starting material, the phosgenation product **does not** contain the corresponding isocyanate in significant, recoverable amounts.

A proper rejection under 35 U.S.C. § 103 must have a **factual** basis. **Not one** of the cited references provides a factual basis for the Examiner's assumption that gas phase phosgenation of an ether-containing amine starting material will produce the corresponding ether-containing isocyanate in high yield and high purity.

With respect to the Examiner's second criticism of Dr. Stutz' Declaration regarding the statement that the present invention is not limited to a contact time of 0.5 to 5 seconds as is the Biskup et al process, Appellants would point out that it is the Biskup et al reference which teaches that contact time is critical to the disclosed process, **not** Appellants. Contrary to Biskup et al's teaching, Appellants have found that it is **not necessary** to limit the contact time of phosgene with their required ether amine starting material.

An invention which does not require a feature taught to be critical by the prior art, can not be considered obvious in view of that prior art. Dr. Stutz' discussion of the fact that the critical contact time limitation of the Biskup et al process is not critical to the claimed process is therefore relevant to the claims of the present application.

The Examiner has also argued that:

“Furthermore, the declarer fails to address the possibility that it is this disclosed contact time that permits the ether isocyanate to be produced in high yield. Therefore, in the absence of such discussion, it can be argued that this feature of Biskup et al. provides teaching as to how to obtain ether isocyanates in high yield.” (at page 4, lines 2-5 of the December 19, 2002 Office Action)

Appellants submit that the above-quoted argument does not provide proper support for the rejection of their claims because Biskup et al **does not teach** that **ether isocyanates** are obtained in high yield by the disclosed process. Indeed, Biskup et al does not teach that ether isocyanates are obtained by the disclosed process in **any** yield. Dr. Stutz' Declaration is therefore relevant to the issue of obviousness of the claimed invention in view of prior art such as the Biskup et al reference.

Appellants therefore continue to maintain that one of ordinary skill in the art reading the cited references in the context of what was known in the art at the time Appellants made their invention (as evidenced, for example, by the sections of Annalen der Chemie discussed in Dr. Stutz' Declaration) would not have expected gas phase phosgenation of ether amines to produce ether isocyanates in good yield, if at all, and high purity.

Absent a reasonable expectation of success, the suggested combination of the teachings of Lehmann et al, Joulak et al, Biskup et al and Bischof et al does not establish a proper *prima facie* case of obviousness.

#### IX. CONCLUSION

Appellants' Examples which teach ether isocyanates having hydrolyzable chlorine contents of from 24 to 48 ppm and Appellants' specification which teaches that pure ether isocyanate may be recovered in accordance with the process of the present are teachings which demonstrate that Appellants were in possession of the claimed invention at the time the parent of the present application was filed. Appellants' Claims 1-4 do therefore satisfy the description requirement of 35 U.S.C. § 112, first paragraph.

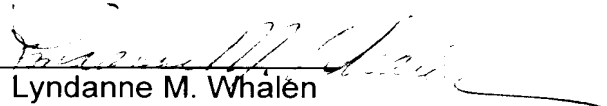


A proper rejection under 35 U.S.C. § 103 can not be supported by assumptions and speculation. Appellants have submitted evidence in the form of Dr. Stutz' Declaration to support their position that one skilled in the art would not have expected gas phase phosgenation of an ether amine to produce the corresponding ether isocyanate in high yield and high purity. Dr. Stutz, an expert in phosgenation processes, clearly rebuts the erroneous assumption that ether amines are equivalent to other amines in a gas phase phosgenation process upon which the Examiner's rejection of Claims 1 and 2 is based.

Appellants therefore maintain that each of the Examiner's rejections is in error and respectfully request that each of these rejections be reversed and that Claims 1-4 be allowed.

Respectfully submitted,

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## APPENDIX - CLAIMS ON APPEAL

1. A process for the production of an ether polyisocyanate having a hydrolyzable chlorine content less than or equal to 48 ppm from an ether (poly)amine comprising reacting

a) an ether (poly)amine

with at least a stoichiometric amount (based on the number of primary amine groups present in a)) of

b) phosgene or a compound which generates phosgene under the reaction conditions

in the vapor phase at a temperature of from about 50 to about 800°C under pressure.

2. The process of Claim 1 in which ether (poly)amine a) is represented by the formula



in which

X represents H, NH<sub>2</sub> or C(R<sup>3</sup>)<sub>4-n</sub>,

R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each represents an optionally branched, an optionally substituted, or an optionally heteroatom-containing C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>3</sub>-C<sub>24</sub> cycloalkyl, C<sub>7</sub>-C<sub>24</sub> aralkyl, or a C<sub>6</sub>-C<sub>24</sub> aryl radical, or

R<sup>1</sup> represents a direct bond of X to the ether oxygen atom bonded to R<sup>2</sup>,

and

n represents 1, 2 or 3.

3. An ether polyisocyanate selected from the group consisting of 2-(2-isocyanato-propoxy)-1-propyl isocyanate, 1,1'-oxydi-2-propyl isocyanate, 2,2'-oxydi-1-propyl isocyanate and mixtures thereof having a hydrolyzable chlorine content of no more than 43 ppm.

4. A process for the production of a urethane comprising reacting the ether isocyanate of Claim 3 with an isocyanate-reactive material.

*Hawley's  
Condensed Chemical  
Dictionary*

*ELEVENTH EDITION*

*Revised by*

N. Irving Sax  
and  
Richard J. Lewis, Sr.



VAN NOSTRAND REINHOLD COMPANY  
New York

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Eleventh Edition  
by N. Irving Sax

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electrical insulators, etc. It involves passage of continuous bundles of glass fiber that have been impregnated with liquid resin through an oven at the rate of 18 inches per minute at 140C (285F).

**pumice.** A highly porous igneous rock, usually containing 67-75% SiO<sub>2</sub> and 10-20% Al<sub>2</sub>O<sub>3</sub>, glassy texture. Potassium, sodium, and calcium are generally present. Insoluble in water, not attacked by acids.

Occurrences: USA (Arizona, Oregon, California, Hawaii, New Mexico), Italy, New Zealand, Greece.

Grade: Lump, powdered coarse, medium, fine; NF, technical.

Use: Concrete aggregate, heat and sound insulation, filtration, finishing glass and plastics, road construction, scouring preparations, paint fillers, absorbents, support for catalysts, dental abrasive, abherent for uncured rubber products, possible substitute for asbestos.

**Pummerer rearrangement.** Rearrangement of sulfoxides to  $\alpha$ -acyloxythioethers in the presence acyclic anhydrides.

**punt.** A solid or hollow iron rod 4-6 ft long, usually with an insulation covering on one end. Use: By glass workers to remove molten material from the melt preparatory to shaping finished articles.

**"Purafil."**<sup>525</sup> TM for an odoroxidant consisting of activated alumina impregnated with potassium permanganate in pellet form. Destroys odors by oxidation.

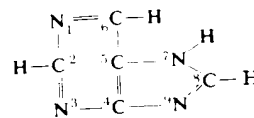
**Purdie (Irvine-Purdie) methylation.** Exhaustive methylation of a methyl glycoside by repeated treatment with methyl iodide and silver oxide, followed by hydrolysis of the pentamethyl ether with dilute acid to yield the anomeric hydroxyl group.

**Purex process.** See reprocessing.

**purification.** Removal of extraneous materials (impurities) from a substance or mixture by one or more separation techniques. A pure substance is one in which no impurity can be detected by any experimental procedure. Though absolute purity is impossible to attain, a number of standard procedures exist for approaching it to the extent of 1 ppm of impurity or less. The following fractionation techniques are widely used: crystallization, precipitation, distillation, adsorption (various types of chromatography), extraction, electrophoresis and thermal diffusion. See also purity, chemical.

**"Purifloc."**<sup>233</sup> TM for a polyelectrolyte. Use: To flocculate solids in water and industrial waste treatment.

**purine.** (1) [imidazo(4,5-d)pyrimidine]. CAS: 120-73-0.



Properties: Colorless crystals; mp 217C; soluble in water, alcohol, toluene.

Derivation: Prepared from uric acid and regarded as the parent substance for compounds of the uric groups, many of which occur naturally in animal waste products.

Use: Organic synthesis, metabolism, and biochemical research.

(2) One of a number of basic compounds found in living matter and having a purine-type molecular structure.

See adenine, guanine, hypoxanthine, xanthine, uric acid, caffeine, and theobromine.

**"Purite."**<sup>84</sup> TM for a specially prepared fused soda ash furnished in the form of 2-pound cast pigs and stated to contain 98% sodium carbonate.

Use: Cupola flux, for refining and desulfuring iron, steel, and other metals.

**purity, chemical.** A substance is said to be pure when its physical and chemical properties coincide with those previously established and recorded in the literature, and when no change in these properties occurs after application of the most selective fractionation techniques. In other words, purity exists when no impurity can be detected by any experimental procedure. There are a number of recognized standards of purity.

See also grade.

**puromycin.** (USAN). CAS: 53-79-2.

C<sub>22</sub>H<sub>29</sub>N<sub>7</sub>O<sub>5</sub>. An antibiotic which inhibits protein synthesis, prevents transfer of amino acid from its carrier to the growing protein. Produced by *Streptomyces alboniger*, effective against bacteria, protozoa, parasitic worms, and cancerous tumors.

Properties: Crystals, mp 176C.

Hazards: Toxic to living cells of all kinds.

**purple of Cassius.** See gold-tin purple.